# *The World's New Oil Field*

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## Alberta
## North West Territories
## Mackenzie Basin

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Compiled by

**Anderson & Brown Consolidated, Ltd.**
Alberta and N.W.T. Financial and Oil Field Brokers
EDMONTON - ALBERTA

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# *Introduction*

Petroleum is the most important of the bitumens, and next to coal the most important of all carbon compounds; also the first development of significance took place barely one-half a century ago. The production has increased by tremendous strides, until today the output has reached enormous proportions. There is no sea whose waters are not churned by oil steamships, no country whose roads have not seen the oil driven motor car, and no village in the civilized world in which a flame of kerosene or other form of petroleum does not illuminate some house. Thousands of miles of highways are kept free from dust or otherwise improved by use of petroleum oil. The Panama Canal was only made feasible by the use of oil, which made the region habitable for the workmen by killing the malaria infected mosquito. Oil is again of vital importance to any navy in the world, and no one realized it better than Great Britain.

We are realizing, and quite right, the transcendent importance to our industrial future of getting into our hands the control of as much oil material as possible. In oil we have the raw material second to none in its usefulness. Indispensable indeed to the process of modern manufacture and transportation, and offering itself as a supreme test of whatever aptitude we may possess for commerce and statesmanship on a big scale. The best policy for us as a nation is to encourage the investment of capital in oil enterprise to develop our great petroleum resources and prospects. Since the armistice was signed, oil has played an important part in the framing of the world peace. The British Government has taken over the controlling ownership of the Anglo Persian Oil Company and has practically insured a mandate over Persia to safeguard its interests. An army is being maintained in Mesopotamia at a cost of over $5,000,000 a day, and it is scarcely denied that the existence of some of the greatest oil fields in the world in that region have been a large feature in dictating the policy of military occupation. Moreover, this indication of national policy has been reflected among the individual and private companies, and there never was a time in the world's history when prospecting for new fields was more earnestly undertaken and more widespread in its sphere of operation.

The world's visible supply of oil is growing pretty steadily, although this course received a check during the war years. Over 580,000,000 barrels of crude oil, about 80 million tons, is an official estimate of the production of 1918, and since then the output has naturally increased.

For some time past about two-thirds of the world's supply has come from the United States. During the war the United States supplied the Allies with 80 per cent of their oil requirements, whether for naval oil, fuel petroleum for land transportation or lubricating oils, which were used in such large quantities. Indeed, the oil deposit of the United States has been worked so extensively that authorities competent to judge are begining to show alarm over the exhaustion of the supply, and this fact makes the prospecting for new fields more important. The United States Government officials made a statement a few months ago of the careful survey of the oil resources of the country, that at the present rate of exhaustion the remaining oil deposit of the United States will last about thirty years; moreover, it must not be forgotten that oil cannot be replaced. Former Secretary of the Interior, Franklin K. Land, puts it clearly when he said that trees can be grown again on the soil from which they have been taken, but how can petroleum be reproduced. It has taken ages for Nature to distill it in her subterranean laboratories. We do not even know her process and no substitute so far has been discovered. It is practically the one motor fuel and the one lubricant of the world today Not a train runs nor a factory operates and not a wheel turns that petroleum in some kind of form is not used. Take petroleum away and the industrial work of the whole world will be at a standstill. With an ever increasing consumption of oil in the United States and Canada, and the limited supplies, the importance of discovering new fields within the British Empire or in lands in which British interests preponminate, becomes more insistent Petroleum is a vital necessity to the British Navy, for the swiftest and biggest warships burn fuel oil exclusively During the war attempts were made in Derbyshire and elsewhere to obtain mineral oil by drilling wells, and met with some success, yet it is certain that for the bulk of her supplies Britain must depend on shipments from overseas It is for this reason that the importance of a new find of oil in the North West Territory, Canada, takes on a special interest

# *Alberta*

The possibilities of Alberta as an oil field has induced the drilling of a large number of test wells. The area within which a possible oil-field and very probable gas field may be found can be outlined as a belt extending from Saskatchewan by way of the Viking fields, northwest to Athabasca river near Athabasca and thence in a broad curve to the Peace River below Peace River Crossing, therefore circling the great depression of central Alberta.

A broadening of the belt northward from this line is evident in the Athabasca Valley, as the oil in the McMurray tar sands seems to be connected with the possibilities of the whole area.

## FORMATION

The formation of Alberta is mostly Cretaceous, with a Tertiary basin filling the great depression or syncline, the axis of which is marked by the McLeod-Edmonton C.P.R. line. To the west, following the Rockies, the Paleozoic rocks are exposed.

The Devonian and Silurian are again exposed in Northern Alberta in the lower Peace River where the first exposure is the cause of the Vermilion Falls or Chutes. Again the Devonian is well exposed along the Athabasca below the tar sands, while on the Slave River the Upper Silurian and Middle Devonian are both lying unconformably on the Laurentian, while the Salt Springs west of Fort Fitzgerald also come from an exposure of Gypsum. The general formation is given in the following table:

### TABLE OF FORMATIONS

| Era | System | Group | Formation |
|---|---|---|---|
| Genozoic | Quaternary | Recent<br>Plestocene | |
| | Tertiary | Pliocene<br>Miocene<br>Oligocene<br>Eocene | Hand Hills conglomerate<br>Paskapoo |
| Mesozoic | Upper Cretaceous | Montana Group | Edmonton<br>Bearpaw<br>Belly River<br>Pierre |
| | | Colorado Group | Benton |
| | | Dakota Group | Dakota (Blairmore) |
| | Lower Cretaceous | Kootenay | Kootenay Coal Measures |
| | Jurassic | | Fernie Shale |
| | Triassic | | Shales |

## TABLE OF FORMATIONS CONT'D.

| Era | System | Group | Formation |
|---|---|---|---|
| Paleozoic | Permian | | Upper Banff shale |
| | Carboniferous | Mississippian | Rocky Mountain Quartzite<br>Upper Banff Limestone |
| | | Pennsylvanian | Lower Banff shale |
| | Devonian | | Lower Banff limestone<br>Intermediate limestone<br>Sawback limestone (age?) |
| | Silurian | | Halysites beds |
| | Ordovicion | | Grapholite shales<br>Goodsir shales |
| | Cambrian | Upper Cambrian | Ottertail limestone<br>Chancellor shales<br>Sherbrooke limestones<br>Paget limestones<br>Bosworth shales and limestones |
| | | Middle Cambrian | Eldon limestone<br>Stephen shale<br>Cathedral limestone |
| | | Lower Cambrian | Gt. White shale and sandstone<br>St. Piran quartzite<br>Lake Louise shale<br>Fairview sandstone and conglomerate |

TABLE OF FORMATIONS CONT'D.

| Era | System | Group | Formation |
|---|---|---|---|
| Archean | Pre-Cambrian | | Hector shale<br>Corral Creek sandstone |
| | Base not exposed | | |

## *Southern Alberta*

Parallel to the Rockies, we have in western Alberta what is known as the foothills, or technically known as a disturbed belt. Several structures are developed in this belt and drilling has been done to test these.

The Paskapoo, Edmonton, Bearpaw and Belly River formations in the foothills have shown no indications of ever having been petroliferous. From the nature of these upper beds it is safe to overlook them when considering petroleum-bearing rocks.

The Colorado group in Canada has not up to the present time been found to contain oil in appreciable amount. Certain small bodies of petrolific shale have been noted, and some of the lower sandy members are of sufficient porosity to be gas reservoirs. These shales act as a cap rock arresting the migration of the underlying oil, and may have been the original source of some of the pretroleum.

The strata underlying the Colorado are the proved oil bearing rocks of the foothills. Included in the strata, so far as has been determined, are four oil horizons as follows:

Oil sand No. 1. The uppermost bed of the Blairmore formation.

Oil sand No. 2. 500 feet below the top of the Blairmore.

Oil sand No. 3. 1100 feet below the top of the Blairmore and in the Kootenay formation.

Oil sand No. 4. About 200 feet below No. 3.

The top bed of the oil sand No. 1 is the only one of these horizons that has been recognized in surface exposures.

On the outcrop it generally weathers to a rusty red, but in places is stained white to a light yellow. On a fresh fracture the rock is jet black with a glistening surface caused by minute crystals of pyrite.

The sandstone is at some places thin-bedded and at oth-

ers it is massive, coarse-grained and even conglomerate. Paraffin stains are observed along the bedding and jointing and in one or two localities very porous phases are saturated with petroleum.

All exposures of the shale and sandstone directly beneath the oil sand show no indications of ever having been petroliferous.

No. 1 oil sand yields a 30 barrel per day production in the Alberta Petroleum Consolidated Oil Company's well No. 1 on the west flank of the Turner Valley anticline.

No. 2 oil sand is a light grey medium-grained sandstone. This horizon does not appear to be of any great importance. The Prudential Oil Company's well No. 1 obtained about five barrels daily from this horizon.

No. 3 oil sand is a light grey sandstone of medium grain and porosity and is about 20 feet thick. The greatest production in the Turner Valley is obtained from this sand by the Southern Alberta Oil Company's well No.1 on the east flank of the anticline. The oil flows at intermittent intervals from a depth of 3,575 feet. The Calgary Petroleum Products Oil Company also obtains oil from this horizon in No. 1 and No. 2 wells.

No. 4 oil sand is a dark, hard, but porous sandstone, underlying a considerable thickness of carbonaceous shales.

It is quite possible that other deeper oil horizons will be encountered.

A great deal of drilling will be done in this district this year. The Imperial Oil Company, who are the largest operators, have recently acquired the Calgary Petroleum Products Company's holdings, consisting of some 7,000 acres of land; and they propose putting some ten rigs on this property this summer independent of their other holes which are now being drilled, of which two are in the Cardston District, two in Willow Creek, one in the Elbow River District, one in the Monitor District, and one in the Czar District and also one in the Irma District. Besides the Imperial Oil Company's operations many more companies are drilling, some of which have struck oil in paying quantities.

## EXTRACTS FROM GEOLOGIST'S REPORT ON THE PEACE RIVER OIL FIELD

### THE PEACE RIVER OIL FIELD, ALBERTA.

The Province of Alberta is underlain by a series of Tertiary and Cretaceous sediments, resting in Northern Alberta on Devonian limestone. The Cretaceous beds are the most important, and contain in addition to oil and gas, large deposits of coal.

The Northern Alberta OIL and GAS field may be said to comprise the larger part of the area between the Atha-

basca and Peace Rivers, with a breadth East-West of perhaps two hundred miles, and North-South of possibly one hundred miles.

The chief oil bearing bed is apparently the Dakota sand lying at the base of the upper Cretaceous series of the region, and the greater erosion along these two main streams has carried away more of the overlying beds, bringing the oil and gas horizon nearer to the surface. Wells drilled along these rivers will, therefore, generally penetrate the oil|gas horizon at a shallower depth than elsewhere, and this fact, combined with the fact of cheap transportation afforded by the rivers themselves, and the connecting railways, naturally has led to first developments along these streams. Judging from the geological surveys of the Canadian Government, the same formations underlie all of the area between the Peace and Athabasca Rivers, and in time, no doubt, exploitation will develop the same oil-gas beds at numerous points in the area.

In the Peace River field the only surface indication of oil is on a small island, locally known as Tar Island, and in Sec. 10, Tp. 87, R. 20, W. 5. At low water at the south end of this island it is said oil may be seen on the water, issuing from a seepage from the underlying cretaceous beds. At any rate the Dakota sand is here some hundreds of feet below the surface.

The strata exposed along the Peace River in the oil field are all of upper Cretaceous age. So far as can be determined by direct observation, the beds appear to be horizontal, but by following the strata for several miles, it will be noted that they have a slight dip to the south of about ten feet to the mile.

Surveys by the Canadian Government show that the Peace River in the oil region had a gradient of about one foot in the mile. In other words, it is nearly flat, and for general purposes may be considered nearly a level body of water, and can thus be used as a datum plane by correcting for the gradient.

The Cretaceous beds consist of alternate layers of sandstone and shale. One of the sandstone layers, locally called the Peace River sandstone, is very persistent. At Peace River Town the under surface of this sandstone is at water level, while in Sec. 36, Tp. 85, R. 21, W. 5, on the west bank, nearly opposite well No. 1 of the Peace River Oil Company, the base of sandstone is about 90 feet above the river. The Canadian Geological Survey estimate the rise of the strata going north to be about 10 or 12 feet to the mile. In a general way, therefore, it can be said that the Cretaceous beds in the Peace River field dip to the south at a gentle angle of perhaps 10 feet to the mile as far as Peace River Town, the indication being, according to the Canadian survey, that south of the town the dip steepens

to 45 feet to the mile. The chief oil-bearing horizon, the Dakota sand, lies about 1050 feet, more or less, below the Peace River sandstone, and since the beds dip to the south, it is evident that going south this horizon will be progressively deeper. Underlying the Dakota sand is Devonian limestone, a much older formation. Nevertheless, according to the Canadian survey, this limestone also lies flat, having about the same dip as the overlying Cretaceous.

This limestone was encountered in well No. 1 of the Peace River Oil Company at a depth of 1127 feet.

It is exposed on the surface by the gradual rise of the formations going north or down stream on the river, at a point many miles to the north.

According to the log of well No. 1 the oil sand existed at 980—1015 feet.

Well No. 2, about 1¼ miles south of No. 1, passed through what was probably the same sand at 960—1032 feet. The oil found in these wells is a fuel oil with asphalt base, Baume 20.7 of an intermediary stage between gravity and flashing points of California and eastern products. An analysis of a five gallon sample of the oil was made by Curtes & Tomkins, of San Francisco. This analysis shows:

10% Distillate
25% Illuminating
25% Lubricating
40% Fuel Oil

The Tar Island Oil and Gas Company, operating on the west side of Peace River, nearly opposite Peace River well No. 2, during 1918, struck oil sand at 970 feet depth. Drilling was discontinued at 997 feet with 200 feet of oil in the casing.

The work thus far done in the Peace River field has proven one fact, viz:—that oil and gas exist there in commercial quantities. It remains to be seen if the oil pools are of considerable extent.

No serious attempt has yet been made to determine if there is any flexing of the oil bearing beds, forming anticlinal structures favorable to the accumulation of oil in pools. To do this, accurate levelling must be done and the degree of dip determined at many points. This having been done, the places where oil pools exist can be indicated with some confidence. The largest oil-pools, however, are just as likely to be away from the river as along its borders.

Beds nearly horizontal are not generally favorable to the accumulation of important petroleum deposits, but we find a structure similar to that of Northern Alberta beds in some fields of commercial importance, such as those of Kansas, Northern Oklahoma, in Ohio and elsewhere.

In the Kansas section the oil and gas occur in sandstone lenses in the Cherokee shale, while in the Peace River section the oil and gas occur chiefly in what is supposed to be nearly a continuous sandstone layer, viz:—the Dakota sand. Both districts are prolific in gas.

The important cast in favor of the Peace River district is that, as above noted, the main oil bearing horizon, the Dakota sand, is reported by the geologists who have studied the formation of northern Alberta as being nearly continuous, although, of course, not everywhere oil-bearing, while in the Kansas field the sands forming oil reservoirs are in lenses and thus not continuous.

From the gas development on the Peace River a large supply of gas is assured.

Peace River is the terminus of the Edmonton, Dunvegan and British Columbia Railway, hence easily accessible from Edmonton.

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## REPORT OF ANALYSIS OF CONDEPETROLEUM FROM PEACE RIVER, ALBERTA

An analysis reveals that it is somewhat distinct in character, yielding principally illuminating and lubricating stock and no gasoline.

It contains about 0.5% paraffin and is apparently of an asphaltic base.

The oil lends itself well to refining. The proportion of sulphur is noticeably high.

To summarize the characteristics of petroleum, it more nearly approaches the flashings encountered in Eastern products than the California oils, though not to such a marked extent. In other words, it appears as an intermediary stage between gravity and flashing points of California and Eastern products. The lubricating stock of 17.90 Be. is in consistency about equal to a medium motor oil, while that part represented as 13.8 B. is like a heavy motor oil.

There are but two commercial groups to be obtained from this crude oil, namely, lamp and lubricating oil.

### ANALYSIS

| | |
|---|---|
| Water | 0.10% |
| Sp. Gravity at 60° F. | 0.929% |
| Baume Equivalent | 20.7% |
| Sulphur | 3.86% |

### Fuel Value

| | |
|---|---|
| Calories (water condensed) | 10297.0 |
| B. T. U. " " | 18535.0 |

Residuum or Crude Oil 37%

From geological report by H. W. Turner, Mining Geologist, San Francisco.

In the Peace River district the companies now drilling

are the Albersas Oil Company, San Joaquin Oil Company, Tar Island Oil and Gas Company, Peace River Petroleum Limited, No. 1; Peace River Petroleum Limited, No. 2 and Peace River Oil Company No. 3, besides other companies now locating on the field.

In the San Joaquin well last fall a flow of gas was struck reputed to be 20 million feet at 1200 feet deep. The pressure was so great that they were unable to go on with the well on account of the diameter of the hole. They are now drilling a new well in the same locality, and expect to strike this flow of gas with a 12 inch hole, when they will be able to shut it down and complete the work through it.

The reports of this new well are very encouraging and an early strike may be anticipated.

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# *McMurray Tar Sands*

While the world known Athabasca Tar Sands have been the source of wonderment to all scientists who have seen them, these tar sands, which are nothing less than a great thickness of sandstone completely saturated with oil, are being scientifically tested now to find a way of extracting the oil from the sands.

To this end a great deal of credit is due to the efforts of Mr. Dan Diver, who is the inventor of a process for extracting the oil without having to remove the sands. This process is controlled by the Athabasca Oil Sands and Extraction Company Limited, who are now operating in the Fort McMurray District.

Their method of extracting the oil seems to be the only practical way of removing the oil without having to remove the sand. As these sands are very thick and gummy it is almost impossible to mine it. This process is by means of drilling a 24-inch hole to the bottom of the tar sands, which will not exceed 300 feet in depth, when a clay heater is placed at the bottom of the hole capable of 2800 degrees F. After the necessary pipes are installed, the top of the hole is cemented over and made airtight. When the heat has reached 800 degrees F. the vapors rise to the top and are taken off in a condenser. After the oil and gasoline is extracted, there is still 25% more gas available than they can use in their heater. In their demonstration plant which was in use here in Edmonton this winter, to each pound of sand they would extract two ounces of very high grade oil, analysis of which here follows. According to this rate, each cubic yard of tar sands contains approximately 43 gallons of oil. Considering the sand to be 30 yards deep, which is a very conservative average, as the tar sands controlled by this company average

150 feet in depth, each acre contains, roughly speaking, 148,000 barrels of oil. The inventor of this process claims he can extract the oil in an acre of land with 8 holes, with an approximate cost of $20,000.

### Report of Fractional Analysis of Sample of Cracked Asphaltic Oil Extracted from the Asphalt Sand Deposits of Northern Alberta

Specimen submitted 1-23-1920 by Mr. C. A. Chesterton.

**Sedimentation of original sample—**

| | |
|---|---|
| Water, by volume | 7.5% |
| Tarry Matter, by volume | 1.5% |
| Oil Mixture, by volume | 91.0% |
| | 100% |

Specific gravity of oil mixture, 28.5°

**Distillation of Oil Mixture—**

| | | | | | |
|---|---|---|---|---|---|
| 1st Fraction | 70° C | | | | |
| | 80 | 1.0% | | | |
| | 90 | 1.0 | | | |
| | 100 | 5.5 | | | |
| | 110 | 1.0 | | | |
| | 120 | .5 | | | |
| | 130 | 1.5 | | | |
| | 140 | .5 | | | |
| | 150 | 3.0 | 14.0% | 53° | Baume |

The above fraction represents the total amount of commercial gasoline present in the oil mixture as submitted.

| | | | | | |
|---|---|---|---|---|---|
| 2nd Fraction | 160° C | 1.0% | | | |
| | 170 | 1.0 | | | |
| | 180 | 4.0 | | | |
| | 190 | 1.0 | | | |
| | 200 | 1.0 | | | |
| | 210 | 2.0 | | | |
| | 220 | 1.0 | | | |
| | 230 | 3.0 | 14.0% | 39° | Baume |
| 3rd Fraction | 240° C. | 4.0% | | | |
| | 250 | 4.0 | | | |
| | 260 | 6.0 | 14.0% | 32° | Baume |
| 4th Fraction | 270° C | 1.5% | | | |
| | 280 | 3.5 | | | |
| | 290 | 7.0 | | | |
| | 300 | 5.0 | 17.0% | 25° | Baume |
| 5th Fraction | 325° C | 14.0% | 14.0% | 21° | Baume |
| 6th Fraction | 350° C | 14.5% | 14.5% | 19° | Baume |
| 7th Fraction | 380° C | 8.0% | 8.0% | 15° | Baume |
| Carbon residue and loss | | | 4.5% | | |
| | | | 100.0% | | |

**Pine Point Oil Seepages**
Pine Point Bituminuos Limestones. Lower Middle Devonian

The above analysis indicates a proportion of commercial constituents as follows—

| | |
|---|---|
| Commercial Gasoline | 14.0% |
| Illuminating Oils | 45.0% |
| Light Lubricants | 28.5% |
| Medium Lubricants | 8.0% |

By practical commercial processes the oil may be so cracked and distilled as to produce greater proportions of gasoline and light oils.

The gasoline and oils indicated in the tabulation and shown on the specimen card will require, before marketing, treatment for deodorization and decoloration similar to oils from other sources.

The gasoline and oils from this oil are of the same character and of like value as those produced from other sources.

(Signed) F. C. FIELD
City Chemist.

Calgary Municipal Testing Laboratory,
January 25th, 1920.

In a public address to the members of an Industrial Congress held in Edmonton in August, 1919, Doctor T. O. Bosworth, Chief Geologist of the Imperial Oil Company Limited, made the following statement:

"In the district of McMurray on the Athabasca River, we have the largest natural exposure of oil in the world. It is interesting to consider the amount of oil in this territory. For this purpose we will suppose the area to be 15,000 square miles, the average thickness 50 feet, and the average yield to be 10 gallons per ton. A simple calculation gives the result as 30,000 million barrels of oil. This is an immense quantity—it is six hundred times the world's annual production."

According to the results obtained from the experiments of Mr. Dan Diver's process for extracting the oil from these sands, we are quite conservative in saying that in this Fort McMurray district there is more oil in sight than the world would use at the present rate of consumption in 750 years.

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## *North West Territory*

Much geological research work has been done by the Geological Survey of Canada. R. C. McConnell, Ogilvie, Doctor Bell, etc., were the earliest explorers of these Northern Fields. In the last few years, as research work went on, oil prospectors were ever going into the found fields and away from transportation. In this way Northern Alberta was looked over, and the great North West Terri-

tories became the active field of these pioneers of science. The work took on such an importance that in 1917 the Dominion Geological Survey sent in two research parties under Doctor E. M. Kindle, Chief Invertebrate Palaeontologist and Devonian Specialist for the Canadian Geological Survey. These parties, one of which was under Doctor Kindle personally, and the other under his chief assistant, T. J. Whittaker, of the Survey, made a reconnaissance trip from Peace River Crossing on the Peace River, down to seven miles below Wrigley. Doctor Kindle was assisted on that trip by R. A. Brooke, of Edmonton. T. J. Whittaker's party restricted their work to gathering fossil material down to Great Slave Lake and Hay River, and made extensive collections on that river, while Doctor Kindle extended his research work further down the Mackenzie river to the point above mentioned. All rock exposures were looked over by Dr. Kindle and R. A. Brooke, and many fossils were collected. The result of that season's field work revealed valuable information and unmistakable evidence that the great Devonian system which underlies the whole of the Mackenzie basin contains immense possibilities as a petroleum field of vast magnitude. Both Dr. Kindle and R. A. Brooke were so impressed with the possibilities of this field that again, independent of each other, they continued their research work, Dr. Kindle going down again to this field in 1919 to complete the work started in 1917, while the Mackenzie River saw R. A. Brooke during each season since 1917. Since 1917 many more experienced geologists have gone over that country. Everyone came back with the same conviction, the same optimistic feeling and unbounded enthusiasm.

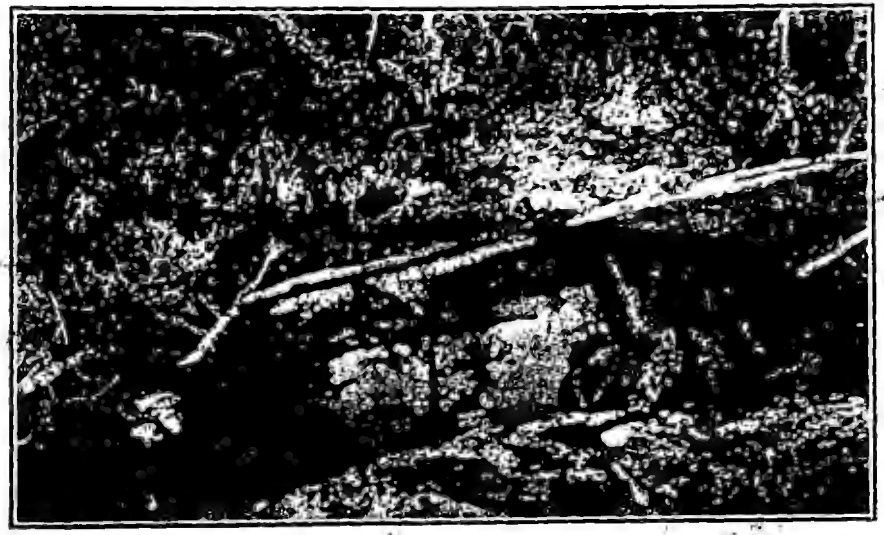
### Formation of North West Territory

### General Geology

From the determination of fossils collected by A. E. Cameron in 1916, and by Dr. Kindle and T. J. Whittaker and R. A. Brooke in 1917-20, the following table of formations has been compiled. The table also shows a probable correlation with a composite, Peace River, Manitoba and New York sections.

**Table of Formations**

| Great Slave Lake Section | Composite correlation |
|---|---|
| **Quarternary** | |
| Lake and river deposits | |
| Glacial deposits | |
| Unconformity | |
| **Cretaceous** | |
| Meander shales | Loon River shales, Peace River, Clearwater, Athabasca |
| Unconformity | |



Oil Seepages, Windy Point
Presqu'ile Dolomite, Middle Devonian

| | | |
|---|---|---|
| **Upper Devonian** | | |
| Hay River limestones | Chemung | New York |
| Hay River shales | Chemung | |
| Simpson shales | Portage | |
| **Middle Devonian** | | |
| Slave Point limestones | Manitoban limestones | |
| Presqu'ile dolomites | Winnipegosian dolomites | |
| Pine Point limestones and limy shales | Elm Point limestones<br>Genesee shales, New York | |
| Unconformity | | |
| **Upper Silurian** | | |
| Fitzgerald dolomitic limestones | Gypsum and upper limestones | |
| Redrock arenaceous limestones | | |
| Unconformity | | |
| **Pre-Cambrian** | | |
| Granite, gneisses and metamorphics | | |

## *Mackenzie Basin*

### Description of Formations

**Pre-Cambrian.** Pre-Cambrian rocks are exposed on Great Slave Lake east of the North Arm and at several places on Slave River above Fort Smith. On the shores of the lake they show as coarse granites and gneisses, intruding greenstone schists and metamorphics. On Les Iles du Large a massive bed of coarse, clear white quartzite is found overlaying the granites, but whether the contact is intrusive or not was not apparent. On Slave River the granites underlie Palaeozoic sediments and the sections frequently show 5 to 10 feet of a coarse arkose lying between the granites and the Palaeozoic sediments.

**Upper Silurian.** The massive bedded gypsum exposed on Peace River and at points on Slave River is referable, on palaeontological evidence, to the Upper Silurian. Near Fitzgerald, coarse, porous, dolomitic limestone carrying an upper Silurian fauna is exposed, and similar sediments are found in the escarpment at the Salt Springs west of Fort Smith.

At Gypsum Point on Great Slave Lake, coarse, porous, dolomitic limestones carrying fossils similar to those found in the dolomitic limestones near Fitzgerald overlie bedded, brick-red, arenaceous limestones carrying gypsum beds.

**Lower Devonian.** No distinctly lower Devonian sediments were observed in the vicinity of the lake shores or on the Peace River. Dr. Kindle reports shales carrying

**Getting Samples of Oil from Oil Seepages on Windy Point**
Presqu'ile Dolomite, Middle Devonian

middle Devonian fossils suggestive of the Ithaca formation, a local facies of the Portage in New York, directly overlying the gypsum series on Peace River. An erosional unconformity exists here between the gypsum series and the overlying shales. On Great Slave Lake, however, a thick series of middle Devonian sediments are found lying between the Simpson shales and the Upper Silurian dolomitic limestone. Fossil evidence shows that the Simpson shales are equivalent to the Portage formation of New York.

**Middle Devonian.** Middle Devonian sediments exposed on the shores of the lake are divided on lithological and palaeontological evidence into three formations: Slave Point limestones, Presqu'ile dolomites, and Pine Point limestones. These may be correlated with the Manitoban limestones, Winnepegosan dolomites, and Elm point limestones of the Manitoba section.

The Pine Point limestones, the lowest member of the series, are exposed in the vicinity of Resolution, at Pine Point on the south shores of the lake, and on Ketsicta point on the north shore. They are thin-bedded, bituminous, dark-colored, fine grained limestones and limy shales.

The thickness of the Pine Point series is not directly observable, but from structural evidence appears to be about 100 feet.

The Presqu'ile dolomites, overlying the Pine Point series, are exposed at Presqu'ile Point and on the Burnt Islands east of Pine Point on the south shore. On the north shore they show as oil-bearing dolomites at the tar springs on Nintsi (Windy) Point, and on the shores of Sulphur Bay. Although not exposed elsewhere on the north shore of the lake, structural conditions suggest their presence in the region between Tagkatea and Ketsicta Points.

Exposures show this formation to consist of two members: an upper, thin-bedded, dolomitic limestone, highly fossiliferous and carrying the diagnostic fossil Stringocephalous Burtoni, and a lower member composed of a coarsely crystalline porous and cavernous dolomite. This latter is the oil-bearing horizon at the tar springs on Nintsi Point. The formation is estimated to have a thickness of about 200 feet.

The Slave Point limestones, composing the upper formation of the middle Devonian, are exposed on the south shore, from Presqu'ile Point to High Point, on Buffalo River, and on the north shore at Slave Point and along the lake shore between House and Moraine Points.

This formation is composed of thin-bedded, medium grained, dark grey, and slightly bituminous limestones, and has an estimated thickness of about 160 feet.

**Upper Devonian.** Upper Devonian sediments in the region are divided into three formations: Hay River lime-

stones, Hay River shales, and Simpson shales. The Hay River limestones and shales carry an abundant Spirifera disjuncta fauna, and may be correlated with the Chemung formation of New York, and the Simpson shales carry some of the fossils characteristic of the Portage formation of New York.

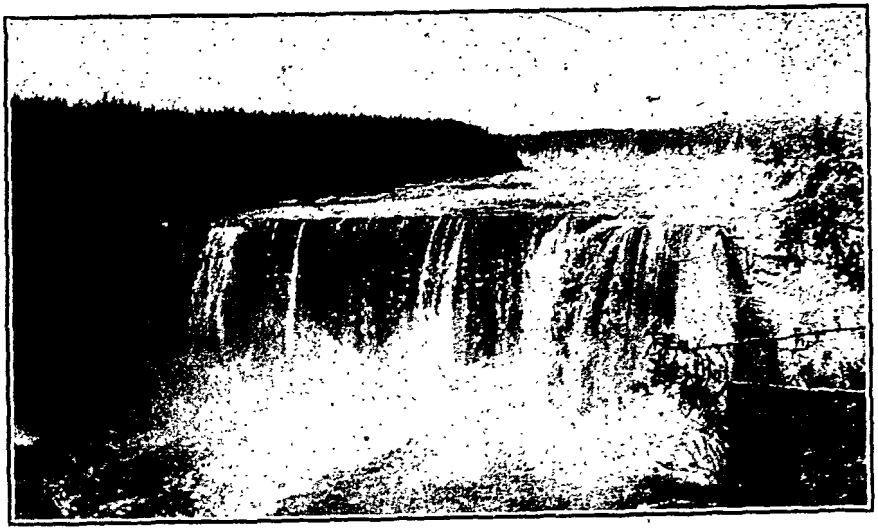
The Simpson shales are not exposed in the vicinity of Great Slave Lake, but on Mackenzie River near Simpson are found underlying the Hay River shales. A thickness of 150 feet is exposed and shows soft, greenish-grey clay shales. Limestone and sandstone bands, so common to the Hay River shales, are absent here, and the fossil evidence does not show the Spirifera disjuncta fauna which is so abundant in the Hay River series. It is probable that these soft Simpson shales underlie the western end of the lake and a considerable portion of the valley of Buffalo River.

The Hay River shales are exposed in the valley of Hay River below the falls, and are also probably present underlying the basin of Buffalo Lake and in the valley of Beaver River. Where exposed on Hay River, they show as soft, bluish green clay shales, and carry thin bands of highly fossiliferous limestone and ripple-marked sandstones. A measured thickness of 400 feet of these shales is exposed in the river valley.

The Hay River limestones directly overlie the soft Hay River shales, and the section as exposed in the gorge on Hay River shows a gradation between the two formations.

The section in the gorge on Hay River shows 221 feet of thick and thin-bedded, hard, fine-grained, light-colored limestones, and at least another 75 feet is exposed in the river valley above the falls. About 40 feet from the base of the limestones occurs a bed of soft fossil clay shales 47 feet thick. The presence of this shaly member in the limestone series has been the cause of the formation of the two falls on Hay River. At the falls on Beaver River the limestones are similar to those at Louise Falls on Hay River. The shaly member is here absent, and in place of an upper fall there is a long series of low cascades from 5 to 15 feet high.

**Cretaceous.** Soft, fissile, dark shales of cretaceous age are exposed in the valley of Hay River at intervals throughout the distance between the 6th meridian and Grumbler Rapids. The contact between these and the under-lying Devonian limestones is not exposed, but would probably show, as elsewhere in Western Canada, an unconformity. The shales show numerous large concretions and occasional ironstone bands, and closely resemble the Loon River shales of the Peace River section. A few miles below the 6th meridian a sandstone layer 25 feet thick shows in the valley, and this very probably represents the Peace



Alexandra Falls, Hay River
Upper Devonian

River sandstones of the Peace River section, which are known to thin out to the east and north.

**Recent.** The entire region is overlain by a heavy deposit of glacial drift. Cut banks on the river valleys frequently show sections 20 to 100 feet thick of boulder clays and gravels of glacial origin.

The meandering character of all the rivers has developed extensive flood-plains of alluvial material on the inside of the curves, and the large rivers have formed widespread deltas at their point of discharge into the lake.

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## STRUCTURAL AND ECONOMIC GEOLOGY

Stratigraphic studies have revealed the presence of a gentle anticline stretching across the lake from Pine Point on the south shore to Nintsi (Windy) Point on the north shore. On the south shore the apex of the anticline is shown on the east side of Pine Point, and the lowest beds exposed show the Pine Point series of bituminous limestones and limy shales. The presence of higher strata, the overlying Presqu'ile dolomites, both to the east on Burnt Islands and to the west at Presqu'ile Point, clearly demonstrates the anticlinal structure. On the north shore the crest appears to lie in the erosion basin of Sulphur Bay. The Presqu'ile dolomites are exposed on the east shore of Nintsi Point, at varying points on the shore of the bay, and eastward to Jones Point; whereas the overlying Slave Point limestones are shown on Slave Point, west of Nintsi Point, and again near House and Moraine Points, northeast of Jones Point.

Structural conditions suggestive of gentle anticlinal folding are noticeable in the limestone outcrops on Buffalo River, and those exposed on Hay River above the falls. Exposures are confined to the valley floors when the rivers have cut down into the Devonian sediments, and on account of the overburden of glacial drift the extent of the folding was not observable.

On Hay River, above the falls, limestone outcrops in the valley show gentle undulations forming anticlines of a low order. The limestones here exposed represent upper members of the Hay River limestones which overlie the thick series of the shales above mentioned.

It is to be noted that the section exposed on Peace River shows members of the Simpson shales series unconformably overlying the gypsum series of upper Silurian age, and thus the middle Devonian section as exposed on Great Slave Lake is here absent. It is, therefore, possible that the dolomites would not be found underlying the shale series in the folded area above the falls on Hay River, or, if present, they would probably be somewhat thinner in

their development than is shown on the shores of the lake. If drilling operations were conducted on Hay River, a thickness of about 1,000 feet of sediments would have to be pierced before the Presqu'ile dolomites would be reached.

Devonian rocks outcrop along the Mackenzie River from Lake Athabasca to within 200 miles of the Arctic Ocean, and also underlie a broad strip of territory on either side of the river. A narrow band of Devonian strata extends south-east from Lake Athabasca to Lake la Ronge, bordering the main Laurentian areas to the east.

McConnell describes the Devonian of the Mackenzie Basin as follows:

> Throughout the Mackenzie district the Devonian is generally divisible lithologically into an upper and lower limestone, separated by a varying thickness of shales and shaly limestones, but in some cases limestones occur throughout. The upper division has an approximate thickness of 300 feet, and consists of a compact yellowish weathering limestone occasionally almost wholly composed of corals, interstratified with some dolomitic beds. This limestone is well exposed at the falls on Hay River, and also at the Ramparts on the Mackenzie. In both of these places it is underlain by several hundred feet of greenish and bluish shales alternating with thin limestone beds. At the Grand View of the Mackenzie the shales are hard and fissile, and are blackened, and in places saturated with petroleum. At the Rock by the River Side and at other places where the beds are tilted and older rocks exposed, the middle division is underlain by 2,000 feet or more of greyish limestones and dolomites interbedded occasionally with some quartzites. No fossils were collected from the lower part of this series, and rocks older than the Devonian may possibly be represented in it.

In 1919 R. A. Brooke collected fossils on Franklin Range for the Canadian Geological Survey, which identified by Dr. Kindle, disclosed a great thickness of Silurian strata.

## GEOLOGICAL STRUCTURE

In the Mackenzie valley, according to McConnell:

> The beds (speaking especially of the Devonian), are practically undisturbed, and are seldom affected by dips exceeding a few feet to the mile.

But he further states in this connection, that:

> For some miles above Bear River the Devonian, which forms the top of the Palaeozoic system in this district, is overlain unconformably by the Cretaceous, and Cretaceous anticlines of limited extent recur at intervals all the way to the Upper Ramparts.

In a report, monumental in its scope and remarkable in its detail upon the oil possibilities of the great west, Dr. Bosworth said of the Mackenzie River region:

"Passing northward from the Great Slave Lake, indications of oil are found in many places. Some of the chief seepages occur in the country beyond Fort Norman, where, throughout an extensive region, the Devonian consists of deposits very favorable for the formation of oil.

"Here we have 300 feet of black bituminous limestones, upon which rest 300 feet of black bituminous shales. The shales smell very strongly of oil, and in places there are large cliffs of them which are now undergoing combustion on the surface. This bituminous series is overlain by a series of clay-shales and sandstones, and it is in these sandstones that the oil occurs. The structure also is favorable, for the strata are folded into large, long anticlines, which are suitable for the accumulation of oil."

## OCCURRENCE OF OIL

According to McConnell:

The Devonian rocks throughout the Mackenzie valley are nearly everywhere petroliferous, and over large areas afford promising indications of the presence of oil in workable quantities. The rock is in several places around the western arm of Great Slave Lake highly charged with bituminous matter, and on the north shore tar exudes from the surface and forms springs and pools at several points.

McConnell says further:

That the springs are situated a couple of hundred yards from the shore, at the base of a low limestone cliff, which runs inland from the lake, and are three in number, each of them being surrounded with a small basin, three to four feet in diameter, filled with inspissated bitumen, while the soil and moss for some distance away is impregnated with the same material. A small quantity of pitch is annually taken from these springs and used for boat building purposes, while a much larger supply could be obtained if needed. A sulphur spring resembling those at Sulphur Point on the south shore of the lake, but much more copious, issues from the foot of the cliff in close proximity to the bituminous springs, and feeds a consideroble stream.

The rock through which the petroleum ascends here is a heavy bedded greyish, rather coarsely crystalline cavernous dolomite, and is entirely unlike the bituminous beds south of the lake and down the Mackenzie, which in most cases consist of calcareous shales. The dolomite is everywhere permeated with bituminous

matter, which collects in the numerous cavities, and oozing up through cracks often forms small pools on the surface of the rock.

The Devonian shales and limestone which outcrop along the southern shore, are more nearly related to the dolomites which underlie the fossiliferous Devonian beds at the Nahannie River and other places. The presence of bitumen in such abundance here also suggests an anticlinal which would bring up lower beds. Sulphur and tar springs are reported to occur at a point about half way between this and Fort Rae, but as I did not hear of them until I had left the lake, I was unable to visit them. A tar spring is also known to exist under the surface of the water in the deep bay immediately east of the Big Island fishery, as many of the boulders and rocks along the shore in this neighborhood are coated with bitumen which has been washed ashore, and hummocks of ice stained with the same material are often observed. On the south shore bituminous shales and limestones outcrop at several points, and it would thus appear that the oil-bearing beds underlie the whole western part of the lake.

McConnell also says that there are several tar springs near Fort Good Hope, and still farther down in the vicinity of old Fort Good Hope, the river is bordered for several miles by evenly bedded dark shales of Devonian age which are completely saturated with oil. These shales are in places so highly charged with bituminous matter that, according to McConnell, spontaneous combustion has taken place. At one place along the Mackenzie (15 miles below Grand View), McConnell describes reddened shales, which he states are undoubtedly due to the burning of the bitumen.

Fifteen miles farther down, according to McConnell:

> The Devonian shales are again found. The shales are black in color, evenly bedded, and highly bituminous. The laminae, when freshly separated, are moistened on the surface with an oily liquid, and burn when thrown into the fire, and patches of red shales, marking the sites of former fires, alternate with dark varieties. The shales are exposed in the right bank for some miles, or almost as far as old Fort Good Hope. They dip down the river at a low angle, and are overlain by the Saskatchewan gravels and boulder-clay.

The most promising region in the North West Territories, from the stratigraphy of the field, appears to be along the Mackenzie and the vicinity of Great Slave Lake. The presence of great quantities of oil bearing beds with a formation unconformably overlapping it, suggests favorably for the accumulation of oil into pools.

The Imperial Oil Company became active in that field in 1919 when they sent their geologist, T. Link, into the

Fort Norman field on the Mackenzie River. The result was the location of the No. 1 well at Fort Norman. In 1920, which can well be called the greatest historical date of Canada, oil was struck at the Imperial Oil Company's well fifty-three miles below Fort Norman, under the supervision of T. Link. Oil of such quality and in such quantities as to satisfy the most avaricious dreams—fifteen hundred barrels per day out of a six inch hole—was the estimated strike of the well.

The analysis of this high grade oil is as follows:

**Analysis Made by Milton, Hersey Co. Ltd.**

Industrial Chemists, Engineers and Inspectors

Montreal Winnipeg

| | | | |
|---|---|---|---|
| Gasoline | | | 20.0% |
| Kerosene | | | 34.0% |
| Lubricant | | | 13.5% |
| Residue | | | 30.0% |
| Loss | | | 2.5% |
| Water | | | Trace |
| Specific Gravity of Gasoline | 59.5° | Be. at | 60° F. |
| " " Kerosene | 42.5° | Be. | " |
| " " Lubricant | 31.5° | Be. | " |
| " " Residue | 19.6° | Be. | " |
| " " Crude Oil as received | 37.5° | Be. | " |
| Cold Test on Crude Oil | | | 50° F. |

This oil is generally rich in all products, and is comparable in the yields of gasoline and kerosene with the Pennsylvania and other oils. The yield of lubricant is somewhat lower, but has no great bearing on the value of the oil.

The gasoline, with a gravity of practically 60° Be., is of a fair grade, the quality of which can be increased by limiting by a few degrees the temperature of distillation, and the yield of it can be augmented by cracking of the kerosene and lubricant fractions.

The residue is liquid, and should form a good fuel oil with the proper addition of lighter oils. It has a very low sulphur content.

The cold test on the sample is 50° F., and at temperatures as low as this it will flow readily in the pipe lines.

The most important item of the analysis made by the Milton Hersey Co. Ltd., and given above, is that a cold test was made on the oil, and it was found that it will flow readily in the pipe lines at such a low temperature as 50° below zero Fahr. This eliminates expense. For instance, the pipe lines can be laid on the open ground and no heating station will be required. If this oil had been of the

Californian type, the field would be of no value. When one considers that after getting the gasoline, kerosene and lubricating contents out of this oil the residue left is still liquid and still 4° Baume higher than the Californian fuel oil, one may begin to grasp the importance of this field.

Mr. T. A. Link, geologist in charge of the experimental work carried on by the Imperial Oil Company in the north last summer, made the statement that one of the biggest oil fields in the world has now been opened in the North. The season's experimentation has absolutely proven the existence of an enormous body of oil rock in the Mackenzie River territory, compared to which Mexico and Peru are in the miniature class.

In the "Oil News," of London, England, in its issue of November the 13th, under the heading of "Great Canadian Oil Field," says in part: "This solitary strike of oil 'in the far north is, if we mistake not, one of the most 'magnificent occurrences in the history of the petroleum 'industry. We believe from evidence which we have been 'at some pains to obtain, and we have considered as atten-'tively and impartially as we can, that this oil field, of which 'the initial well has been brought in, is going to prove the 'greatest so far known within the British Empire.

"While the Fort Norman oil field is the only one to 'date to be proven, there are many others which will soon 'be. Great Slave Lake, where the second well is being 'drilled by the Imperial Oil Company, promises to be as 'great."

## CLIMATE

Since the basin of the Mackenzie River extends over about 17 degrees of latitude, its climate is necessarily of such variety that it cannot be discussed satisfactorily in a general way. The summer climate of the Mackenzie basin, however, is not so much governed by latitude as the winter climate, for the isotherms for summer run in a northwesterly direction almost parallel to the length of the basin, indicating a uniformity of temperature in that direction. The 55 degrees summer isotherm, for example, runs from Kenora on Lake of the Woods northwesterly to the east of Lake Winnipeg, and thence through the east end of Lake Athabasca, the middle of Great Slave Lake, and west end of Great Bear Lake to Good Hope on the Arctic Circle, where it swings west into the mountains. The isotherms for the year, however, show a closer coincidence with the lines of latitude, and indicate a decrease in temperature with an increase of latitude. This is due not so much to lower extremes of temperature in the northern latitudes as to a longer period of low temperatures in those regions throughout the year. The high latitude of, for example, Simpson at the mouth of the Liard River, means a long,



# *Information*

We shall be glad to give you any further information regarding any of the districts mentioned in this booklet.

**Anderson & Brown Consolidated Limited**

**EDMONTON - CANADA**

cold winter, and a short but warm summer. It involves, also, however, a great increase in the amount of possible sunshine during the important growing period from May 15th to August 15th. Compared with Ottawa, Ontario, Simpson has an average of three hours more sunlight daily for the summer months, which means about eighteen days of additional sunshine during the three months when sunshine is most important.

In general it may be said that any point in the Mackenzie basin has a milder climate than any corresponding point of the same latitude in northern Manitoba, Ontario or Quebec, probably because it is farther removed from the chilling influence of the large body of water, frozen for a great part of the year, contained in Hudson Bay; also because it comes within the sphere of influence of the warm winds from the Pacific, and because of its soil covering.

Precipitation is fairly uniform throughout the whole basin, and is nowhere excessive. It is in general slightly higher than that which obtains on the prairies of Alberta and Saskatchewan, but nowhere as heavy as it is on either the Atlantic or Pacific coasts. The total precipitation ranges between 15 and 20 inches annually, and the snow on the central portion of the basin lies usually to a depth of about two feet. Snowfall is somewhat greater in the mountains to the west, and the precipitation, too, is higher.

The whole basin is wooded, and although storms and blizzards occur occasionally, they are by no means as violent as they are on the prairies because of the protection of the forests.

## No. 1

### FORT NORMAN OIL FIELD

Fifty-three miles below Fort Norman on the Mackenzie River, the Imperial Oil Company put down their first test hole in the Mackenzie basin. The well was completed in August of 1920 when oil was struck at 800 feet with an estimated production of 1500 barrels per day out of a six-inch casing. It was estimated by Dr. Beede, of the University of Texas, of Austen, Texas, that, had the well been put down with the customary diameter of fourteen inches instead of six, a production of 10,000 barrels per day would have been the result. Considerable staking of claims was done in the vicinity of the well. Several parties made the trip over the ice in the winter and filed on leases in this vicinity. A large number of companies and oil corporations are now sending in drilling equipment for development purposes, and a great deal of work will be done this year. The Imperial Oil Company will continue this work energetically, and pipe lines are already being applied for.

## No. 2

### WINDY POINT

The second field of inportance in the North West Territory is situated on the north shore of Great Slave Lake, where the Imperial Oil Company have a well in the vicinity of Tar Springs on Windy Point. In the fall of 1920 they had reached a depth of 300 feet, but owing to the late season work was suspended for the winter. This well will be completed early this season. The conditions met with in this well are most encouraging, and from all indications little doubt is expressed that a very big flow will be struck.

A great deal of staking was done there in the seasons of 1919 and 1920, the largest holders being the Imperial Oil Company. Several other large companies have their rigs on the way, and a good deal of drilling will be done in this locality this year.

## No. 3

### PINE POINT

This field is on the south shore of the Great Slave Lake, and was recently discovered by R. A. Brooke, who was the original staker in 1919. Since this the Imperial Oil Company became interested in the field, and considerable acreage was acquired by them. This field promises to be the center of activity on the Great Slave Lake for the coming season, for its advantages, geologically and geographically speaking, offer great inducements to oil operators, as it is the closest situated field to the end of transportation by rail, and could be easily reached by railway or pipe line without any rivers to cross. The Northwest Oil Company, of Montreal, will be doing considerable drilling in this field, and fourteen car loads of equipment are now on the way there. The Imperial Oil Company are also contemplating drilling at this point.

## No. 4

### McMURRAY TAR SANDS

This is the largest known deposit of oil in the world, and enough oil is present in these sands to supply the world at the present rate of consumption for many centuries. Several companies are experimenting on different processes for the extraction of the oil, and results obtained show a very high grade product.

## No. 5

### PEACE RIVER

In the Peace River district four different oil companies are actively engaged in completing their wells. The results so far are very encouraging, and an early strike is anticipated.

## No. 6

### POUCE COUPE

A great deal of attention has been paid to this district in the past few months. The Imperial Oil Company have staked some 70,000 acres of land in this district, where many seepages occur and favorable structures exist. Other large companies are also staking at the present time, and several drills are now being moved onto the property by the Imperial Oil Company and others. A great deal of activity is expected in this field this year.

## No. 7

### HIGH PRAIRIE

At the present time this field is in its initial stage. Several large companies have acquired holdings there, and considerable development work is looked for this year.

## No. 8

### BIRCH LAKE

This field is situated on the northwestern end of the Battle River anticline, and offers some of the best inducements for oil operators. Several wells are now being put down, and although not completed, the indications are such that substantial results can be looked for.

## No. 9

### IRMA

Drilling operations in the vicinity of Irma, situated on the same structure as Birch Lake, resulted in bringing in a flow of 10,000,000 cubic feet of wet gas. Drilling was suspended owing to the difficulties met with by the gas pressure. The Imperial Oil Company have taken this well over and will complete it this summer.

## Nos. 10 and 11

### CZAR AND MONITOR

These two fields are situated on the southeast end of the Battle River structure, and much the same conditions met with at Irma and Birch Lake are present in these fields. The Imperial Oil Company and others are now testing the possibilities of these fields.

## No. 12

### OKOTOKS

Okotoks is the oldest field in Alberta, and the Dingman discovery well marks the beginning of the activity in western Canada where there are several producing wells. The Imperial Oil Company have recently acquired large holdings in this district, and they propose drilling several holes this year.

# EDMONTON

## Capital of Alberta

**POPULATION 70,000 PEOPLE**

HEADQUARTERS FOR THE WORLD'S NEW OIL FIELD

825 miles West of Winnipeg—195 miles north of Calgary

Railway and Industrial Centre of the West Gateway to the Peace River Country, rich in Agriculture and Minerals, and to the Great North, including the—

**FORT NORMAN AND MACKENZIE BASIN OIL FIELDS**

Distributing point for an area exceeding 200,000 square miles, and centre of the following oil fields:—

WINDY POINT, and PINE POINT
(Great Slave Lake)

CZAR, COALSPUR, IRMA

PEACE RIVER, POUCE COUPE

HIGH PRAIRIE
and
THE ENTIRE ALBERTA OIL FIELD

# Comparisons Which Speak for Themselves

**Population**

1901—3,000.
1921—Over 70,000.

**Railways**

1890—None.

1921—Served by the Canadian Pacific, the Grand Trunk Pacific, the Canadian Northern, and Edmonton, Dunvegan and British Columbia Railways.

1795—Edmonton was founded as a trading post by the Hudson's Bay Company.

1921—Edmonton is an industrial and distributing centre for an area comprising 200,000 sq. miles.

## Other Points of Interest

The Province of Alberta contains 14% of the entire coal reserves of the world and 87% of that of the Dominion of Canada.

The city contains several fine hotels, including the palatial "Macdonald," erected by the Grand Trunk Pacific Railway at a cost of $2,000,000.

The cost of the High Level Bridge across the North Saskatchewan River, a triumph of engineering, was 2½ million dollars—a feat upon which the Canadian Pacific Railway is to be congratulated.

On the creation of the Province of Alberta out of the North-West Territories, in 1905, Edmonton was chosen as the capital, and its strategic position has made it the centre of activity in the present oil boom.

**Burning Oil Seepages on Windy Point**
Presqu'ile Dolomite, Middle Devonian

THE WESTERN VETERAN PUBLISHING CO., LTD.